CLAIMS

1. A Hall sensor comprising:
a Hall element supported by a substrate;
an insulating layer disposed over the Hall element; and
a segmented field plate positioned over the Hall element.

2. The Hall sensor of claim 1 and further comprising feedback connections between sense outputs of the Hall element and the segmented field plate.

3. The Hall sensor of claim 2 and further comprising an amplifier coupled to the feedback connections between the sense outputs of the Hall element and the segmented field plate.

4. The Hall sensor of claim 3 wherein the feedback causes the Hall sensor to act as a latch.

5. The Hall sensor of claim 3 wherein the feedback causes a linear response of the Hall sensor.

6. The Hall sensor of claim 1 wherein the segmented field plate comprises four segments.

7. The Hall sensor of claim 6 wherein Hall element is substantially rectangular in shape and the segments are disposed in four separate quadrants defined by lines extending between opposite corners of the Hall element.

8. The Hall sensor of claim 7 wherein opposing diagonal segments are electrically connected.

9. The Hall sensor of claim 8 wherein the Hall element comprises a positive bias corner, a negative bias corner, a positive sense corner and a negative sense corner, and wherein a differential feedback signal is provided to the pair of electrically connected, diagonally opposed segments.

10. The Hall sensor of claim 1 wherein the segmented field plate comprises two segments.

11. The Hall sensor of claim 10 wherein Hall element is substantially square in shape and the segments each substantially cover two diagonally adjacent quadrants of the Hall element.

12. A Hall sensor comprising:

a Hall element supported by a substrate;

an insulating layer disposed over the Hall element;

a segmented field plate positioned over the Hall element; and

means for applying dynamic bias control to the segmented field plate.

13. A Hall sensor comprising:

a Hall element supported by a substrate, wherein the Hall element has a pair of sense outputs;

an insulating layer disposed over the Hall element;

a segmented field plate positioned over the Hall element; and

an amplifier coupled to the sense outputs of the Hall element, the amplifier having outputs coupled to the segmented filed plate.

14. The Hall sensor of claim 13 wherein the amplifier comprises a fully differential amplifier.

15. The Hall sensor of claim 14 wherein the amplifier has a gain of between approximately 200 and 500.

16. A Hall sensor comprising:

a rectangular Hall element supported by a substrate, wherein the Hall element has a pair of sense outputs in opposing corners and a pair of bias outputs in opposing corners;

an insulating layer disposed over the Hall element;

a four way segmented field plate positioned over separate quadrants of the Hall element defined by lines between opposing corners, wherein diagonally opposed filed plates are electrically coupled; and

an amplifier coupled to the sense outputs of the Hall element, the amplifier having outputs coupled to the segmented filed plate.

17. The Hall sensor of claim 16 wherein the Hall element comprises a positive bias corner, a negative bias corner, a positive sense corner and a negative sense corner, and wherein a differential feedback signal from the amplifier is presented to the pair of electrically connected, diagonally opposed segments.

18. A Hall sensor comprising:

a Hall element supported by a substrate;

an insulating layer disposed over the Hall element;

a segmented field plate positioned over the Hall element, wherein the segments are electrically isolated from each other; and

feedback connections between sense outputs of the Hall element and the segmented field plate.

19. The Hall sensor of claim 18 wherein the Hall element is formed with an N-doped layer of semiconductor supported by a P-doped substrate.

20. The Hall sensor of claim 19 wherein the insulating layer comprises silicon dioxide.

21. A method of forming a Hall sensor, the method comprising:

forming a Hall element;

forming an insulating layer over the Hall element;

forming a segmented conductive plate over the insulating layer to significantly cover the Hall element; and

forming conductors to provide dynamic bias control for the Hall element.

22. A method comprising:

segmenting a field plate over a Hall element;

electrically isolating segments of the field plate from each other; and

providing feedback to selected segments from sense contacts of the Hall element.

23. The method of claim 22 wherein the feedback is positive.

24. The method of claim 23 and further comprising amplifying the feedback to cause latching of the Hall element.

25. The method of claim 23 and further comprising amplifying the feedback to enhance magnetic responsivity while maintaining linearity.

26. The method of claim 22 wherein the feedback is negative.

27. The method of claim 26 and further comprising controlling the feedback to enhance linearity.